

ABSTRACT

A supported distributed Bragg reflector or superlattice structure formed from a substrate, a nucleation layer deposited on the substrate, and an interlayer deposited on the nucleation layer, followed by deposition of (Al,Ga,B)N layers or multiple pairs of (Al,Ga,B)N/(Al,Ga,B)N layers, where the interlayer is a material selected from AlN, $\text{Al}_x\text{Ga}_{1-x}\text{N}$, and AlBN with a thickness of approximately 20 to 1000 angstroms. The interlayer functions to reduce or eliminate the initial tensile growth stress, thereby reducing cracking in the structure. Multiple interlayers utilized in an AlGaIn/GaN DBR structure can eliminate cracking and produce a structure with a reflectivity value greater than 0.99.